

Claims

1. A method for the manufacture of one component, heat curable, thermosettable, epoxy resin systems and their placement in convenient container types, sizes and shapes, which comprises mixing

(A) epoxy resins, or epoxy containing compounds

(B) an amine solidifying system present in insufficient quantities to cause gelation after all the amino hydrogen atoms are consumed by epoxy groups, under the reaction conditions chosen for (A) and (B), and which yields a product with a Kofler Heat Bank melting point of less than 55 °C and melting point stability of at least six months at normal workshop temperatures, optionally

(C) a hardener system for (A) and the reaction product of (A) and (B) which is different from (B) and remains substantially unreacted under the conditions of reaction chosen for (A) and (B) with (A) and (B), optionally

(D) other additives that may be required to modify the physical properties of the cured or uncured composition and optionally

(E) an expanding agent in such a way that very little reaction is allowed to take place during the mixing operation between (A) and (B) and most of it takes place in the final shape or container it is needed in before further melt or other processing, provided that the reaction between (A) and (B) does not generate enough heat in the chosen shape or container to significantly activate reaction between the remaining epoxy groups and hardener (C), or expanding agent (E).

2. A method according to Claim 1 in which the mixing of the composition is carried out batchwise or continuously.

3. A method according to Claim 1 or 2 where the choice of composition, mixing method, temperature and time minimises the reaction between (A) and (B) during mixing and is too mild to significantly activate hardener (C) or expanding agent (E).

4. A method according to any preceding claim where the mixed composition and the shape and size of container ensure that the excess heat generated does not increase the temperature of the composition to a point to significantly activate hardener (C) or expanding agent (E).
5. A method according to any preceding claim where the mixed composition is put into the required shape and size of container and allowed to react at workshop temperatures until the required solidification level has been reached.
6. A method according to any preceding claim where the composition is mixed in its final container.
7. A method according to any preceding claim where the solidification reaction approaches completion between 1 and 30 days, preferably between 2 and 14 days.
8. A method according to any preceding claim where the partially solidified composition is heated to speed completion provided the temperature chosen or the temperature reached due to the completion of the solidification reaction does not significantly activate hardener (C) or expanding agent (E).
9. A method according to any preceding claim where the majority of the epoxy groups are present as glycidyl ether, glycidyl amine, glycidyl ester, cycloaliphatic and other epoxy resins.
10. A method according to any preceding claims where the epoxy group containing compounds individually or as mixtures are free flowing liquids at 80 °C or below.
11. A method according to any preceding claim where the solidifying agents are mainly aromatic cycloaliphatic or dicyclic primary amines, secondary amines or mixtures thereof and optionally acid accelerators.
12. A method according to any preceding claim where the majority of the solidifying amine groups are difunctional and polyfunctional with respect to the epoxy groups.

13. A method according to any preceding claim where hardener system (C) is present and is selected from aromatic amines such as 4,4'-diaminodiphenyl sulphone, boron trifluoride amine complexes, latent imidazoles, carboxylic acids, hydrazides, dicyandiamide, latent epoxy amine adducts and substituted ureas.
14. A method according to any preceding claim which contains additional materials to modify the physical properties of the cured or uncured composition.
15. A method according to any preceding claim in which expanding agent (E) is present and is an agent generating gases by chemical decomposition or by boiling of liquids or expansion of gases contained within expandable shells.
16. A one component, heat curable, thermosettable, epoxy resin system obtained by reacting
- (A) an epoxy resin or epoxy containing compounds with
  - (B) an amine solidifying system present in insufficient quantities to cause gelation after all the amino hydrogen atoms are consumed by epoxy groups, under the reaction conditions chosen for (A) and (B), and which yields a product with a Kofler Heat Bank melting point of less than 55°C and melting point stability of at least six months at normal workshop temperatures, optionally in the presence of
  - (C) a hardener system for (A) and the reaction product of (A) and (B) which is different from (B) and remains substantially unreacted under the conditions of reaction chosen for (A) and (B) with (A) and (B), optionally in the presence of
  - (D) other additives that may be required to modify the physical properties of the cured or uncured composition and optionally in the presence of
  - (E) an expanding agent which remains substantially unreacted under the conditions of reaction chosen for (A) and (B) with (A) and (B).
17. A system according to claim 16 in which hardener system (C) is present.
18. A system according to claim 16 or 17 in which expanding agent (E) is present.

19. The use of a system according to any one of claims 16 to 18 for processing by hot melt techniques.

20. A cured product obtained by heating a system according to any one of claims 16 to 18.

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